IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

In re the Application

Inventor	:	**Wilhelmus Hendrikus Alfonsus Bruls et al.**
Application No.	:	**09/773,156**
Filed	:	**January 31, 2001**
For	:	**VIDEO ENCODING AND DECODING**

APPEAL BRIEF

On Appeal from Group Art Unit 2613

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Date: August 29, 2005

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I. REAL PARTY IN INTEREST

The real party in interest is the assignee of the present application, U.S. Philips Corporation, and not the party named in the above caption.

II. RELATED APPEALS AND INTERFERENCES

With regard to identifying by number and filing date all other appeals or interferences known to Appellant which will directly effect or be directly affected by or have a bearing on the Board's decision in this appeal, Appellant is not aware of any such appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-12 all have the status "previously presented." All of the claims are pending, stand finally rejected, and form the subject matter of the present appeal.

IV. STATUS OF AMENDMENTS

In response to the patent application filed January 31, 2001, containing claims 1-12, and assigned US Patent Application Serial No. 09/773,156, a first Office Action was mailed on August 3, 2004. Claims 1 -12 were rejected under 35 USC §102(b) as being anticipated by Yonemitsu (USP no. 5,485,279).

On November 2, 2004, a response to the first Office Action was timely filed

which presented arguments why the reference cited failed to render anticipate the claimed invention. Amendments were made to claims 1-12 to correct errors in form.

On April 1, 2005, a second and Final Office Action was mailed and again rejected claims 1-12 as being anticipated by anticipated by Yonemitsu for the same reason stated in the first Office Action.

On February 24, 2005, a response to the second and Final Office action was timely filed that presented additional arguments as to why the claimed invention was not anticipated by the recited reference. No amendments were made to the claims

An Advisory Action was mailed on June 17, 2005, which maintained the reason and provided further explanation for rejecting the claims. The Advisory Action stated that the amendments made to the claims were entered for the purposes of an appeal.

A Notice of Appeal, with appropriate fee, was filed on June 27, 2005. This Appeal Brief is being filed within two (2) months after the filing of the Notice of Appeal.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention describes a video encoder and a method of encoding images in a second, lower, resolution with reference to two reference images having the second lower resolution and for storing the two reference images with the second resolution (see page 1, line 28-page 2, line 2). More specifically, the encoder includes a memory (81) for storing a reference image in a high resolution mode (referred to as D1) and has the capability of storing two reference images having substantially half of the high resolution (referred to as ½ D1). The memory unit further includes user-operable switches 82a and 82b for selectably switching the encoder into the high-resolution encoding mode or the

low-resolution mode. (see page 3, lines 14-20 and Figure 1). In the high-resolution encoding mode, images having D1-resolution are written into and read from memory 81 with the switches 82a and 82b in the high-resolution mode. In this mode, only one image at this high-resolution is stored so the encoder may produce I-pictures or P-pictures. (see page 3, lines 21-24). I-pictures are autonomously encoded without reference to a previously encoded image. (see page 3, lines 24-25). P-pictures are predictively encoded with reference to a previous I or P-picture. (see page 3, line 25-26). The previous picture is stored substantially in the whole of memory 81.

In the low-resolution mode, images having ½ D1 resolution are written into and read from memories 81a and 81b. In this mode, two other switches 83 and 83 are operational to control which memory (81a and 81b) is read by the motion estimator. In the low-resolution mode P-pictures are alternately read from and written into the memories 81a and 81b so that memory 81 keeps the last two I or P-pictures at any time. B-pictures are encoded with reference to a previous and a subsequent I or P-picture that are stored in the memory. (see page 4, lines 4-13).

VI. GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL

This issue in the present matter is whether:

1. Claims 1-12 are anticipated under 35 USC §102(b) by Yonemitsu

VII. ARGUMENT

I. Rejection of Claims 1-12 under 35 USC §102((b) as being anticipated by Yonemitsu

Claims 1-13 stand rejected under 35 USC §102(b) as being anticipated by Yonemitsu as set forth in the Final Office Action mailed on April 1, 2005. The Advisory Action, dated June 17, 2005, provides further reasoning for rejecting the claims and states that "Yonemitsu's figure 20 is an MPEG video encoder and that element 121 is the image memory storage that stores references images in a second resolution mode (note the term ¼ resolution frame memory for element 121 is the second resolution, whereas element 63 is a memory used for full-resolution frames, i.e., the first resolution), since the memory is used to store at least two images such as two reference images for later use such as applying the reference frames for predicting the following frame in a cyclical, recursive image coding process. Thus, Yonemitsu meets the broadly claimed limitation 'encoding said images in a second, lower resolution mode with reference to two reference images having said second resolution, and for storing said two reference images with the second resolution in said memory."

Difference between the Claimed Invention and the Primary Reference

The instant invention, as recited in claim 1, which is typical of the remaining independent claims, recites:

> 1. A video encoder for encoding images in a first resolution mode with reference to a reference image having said first resolution, the encoder comprising:
>
> a memory having the capacity for storing said reference image with said first resolution; and

control means:

for selectably encoding said images in a second, lower resolution mode with reference to two reference images having said second resolution, and

for storing said two reference images with the second resolution in said memory.

Yonemitsu generally teaches producing a lower resolution image from the combination of a high-resolution image that is dynamically reduced and a single prior stored lower resolution image. This is shown in Figures 14, 16, 18 and 20; Figure 20 is referred to in the instant Office Action and again in the Advisory Action.

Figure 14 illustrates an encoding circuit wherein a one-quarter resolution image is formed from a current high-resolution image that is reduced in resolution (117) and a prior high-resolution image (111,112) that was reduced in resolution. The prior high-resolution image is stored in a full-resolution image memory and the lower resolution image is stored in the lower-resolution image memory. In this illustrated encoder, the lower-resolution image is formed from two high-resolution images that are both resolution reduced; only one of the lower resolution images is stored in the low-resolution image memory.

Figure 16 illustrates an encoding circuit wherein a lower resolution image, i.e., ¼ resolution, is produced as a reduced resolution image of a high-resolution image and a lower resolution image, which was stored in a low resolution memory 121. (see col. 20, lines, 2-8, which state, "[d]ata C9 constitutes mismatching error data representing the difference between 4X4 predicted image data ... included in a predetermined portion of the predicted image data produced from a high-resolution data stored in a full-resolution frame memory and 4X4 predicted image data groups produced by processing quarter-resolution data stored in a quarter-resolution frame memory.). In this illustrated encoder a lower resolution image is produced from a reduced resolution full-resolution image and a stored lower resolution image. Only one stored lower resolution image is used in the determination of the lower resolution image.

Figures 18 and 20 also illustrate encoders wherein a high-resolution image, stored in a full-resolution memory, is resolution-reduced (component 112) and combined with a lower resolution image stored in a reduced resolution memory to produce a lower resolution image. Again only one stored lower resolution image is used in the determination of the lower resolution image.

Thus, Yonemitsu teaches producing a lower resolution image from a high-resolution image that is dynamically reduced and a single stored lower resolution reference image.

Yonemitus Fails to Anticipate the Claimed Invention

"Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, *arranged as in the claim*." Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added).

Contrary to the position stated in the Final Office Action and the Advisory Action, Yonemitus fails to disclose each and every element recited in claim 1. More specifically, the present invention describes a process for encoding images in a second resolution where the reference images are stored in a memory in the second resolution. ("encoding said images in a second, lower resolution mode with **reference to two reference images** having said second resolution, and for **storing said two reference images with the second resolution** in said memory,").

Yonemitsu fails to disclose determining a lower resolution image from two reference images that were stored in the memory. Accordingly, Yonemitsu cannot be said to anticipate claim 1 because Yonemitsu does not disclose each and every element claimed.

In view of the above, applicant submits that claim 1 is patently distinguishable and allowable over the teaching of Yonemitsu.

With regard to independent claims 6, 11 and 12, these claims recite subject matter is similar to that recited in claim 1 and have been rejected for the same reason used in rejecting claim 1. Accordingly, for the remarks made with regard to claim 1, which are reasserted, as if in full herein, applicant submits that these claims are also not anticipated by Yonemitsu.

With regard to the remaining dependent claims, these claims depend from the independent claims, which have been shown to include subject matter not disclosed by, and allowable, over Yonemitsu . Applicant respectfully submits that the dependent claims are allowable at least for their dependence upon an allowable base claims, without even contemplating the merits of the dependent claims for reasons analogous to reasoning held by *In re Fine*, 837 F.2d 1071, 5 USPQ 2d 1596 (Fed. Cir. 1988) which found that if an independent claim is non-obvious under 35 U.S.C. §103(a), then any claim depending therefrom is non-obvious. In this case, the remaining claims depend from allowable based claims, and, hence, these claims contain subject matter not disclosed by Yonemitsu .

In view of the above, applicant submits that all of the above referred-to claims are patentable over the teachings of Yonemitsu and respectfully requests this honorable board reverse the rejection of the claims.

VIII. CONCLUSION

In view of the law and facts stated herein, it is respectfully submitted that the teachings of Yonemitsu fails to anticipate the claimed invention and the burden of showing that Yonemitsu discloses all of the features, expressly or inherently, recited in the claims has not been met. Therefore, reversal of all outstanding grounds of rejection is respectfully solicited.

Respectfully submitted,
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Date: August 29, 2005

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VIII. CLAIMS APPENDIX

The following are the claims of record and the subject of the matter before the Board:

1.(Previously presented) A video encoder for encoding images in a first resolution mode with reference to a reference image having said first resolution, the encoder comprising:

a memory having the capacity for storing said reference image with said first resolution; and

control means:

for selectably encoding said images in a second, lower resolution mode with reference to two reference images having said second resolution, and

for storing said two reference images with the second resolution in said memory.

2. (Previously presented) The video encoder as claimed in claim 1, further comprising:

a motion estimation circuit applying a predetermined search strategy in the first resolution mode to search motion vectors representing motion between an input image and the reference image, said motion estimation circuit being arranged to apply said search strategy in the second resolution mode to both reference images.

3. (Previously presented) The video encoder as claimed in claim 2, wherein selected images are encoded in the second resolution mode with respect to one of said reference images, the motion estimation circuit being arranged to apply the search strategy in a first pass to search motion vectors with a first precision, and to apply said search strategy in a second pass to refine the precision of the motion vectors found in the first pass.

4. (Previously presented) The video encoder as claimed in claim 2, further arranged to selectably encode images in a third, yet lower resolution mode with reference

to two reference images having said third resolution, said motion estimation circuit being arranged to apply said search strategy in the third resolution mode to both reference images, and to apply the search strategy for each reference image in a first pass to search motion vectors with a first precision, and to apply said search strategy in a second pass to refine the precision of the motion vectors found in the first pass.

5. (Previously presented) The video encoder as claimed in claim 1, wherein said reference image having the first resolution is a previous image of a sequence of images, one of the reference images having the second resolution is a previous image of said sequence, and the other one of the reference images having the second resolution is a subsequent image of said sequence.

6. (Previously presented) A method of encoding images in a first resolution mode with reference to a reference image having said first resolution, comprising the steps of:

storing said reference image with said first resolution in a memory having the capacity therefore;

selectably encoding said images in a second, lower resolution mode with reference to two reference images having said second resolution; and

storing said two reference images with the second resolution in said memory.

7. (Previously presented) The method as claimed in claim 6, further comprising the step of:

searching motion vectors representing motion between an input image and the reference image in the first resolution mode, said searching being applied to both reference images in the second resolution mode.

8. (Previously presented) The method as claimed in claim 7, wherein selected images are encoded in the second resolution mode with respect to one of said reference images, the searching step being applied in a first pass to search motion vectors with a

first precision, and in a second pass to refine the precision of the motion vectors found in the first pass.

9. (Previously presented) The method as claimed in claim 7, further arranged to selectably encode images in a third, yet lower resolution mode with reference to two reference images having said third resolution, said searching step being applied in the third resolution mode to both reference images, and in a first pass to search motion vectors with a first precision, and in a second pass to refine the precision of the motion vectors found in the first pass.

10. (Previously presented) The A method as claimed in claim 6, wherein said reference image having the first resolution is a previous image of a sequence of images, one of the reference images having the second resolution is a previous image of said sequence, and the other one of the reference images having the second resolution is a subsequent image of said sequence.

11. (Previously presented) A video decoder for decoding images in a first resolution mode with reference to a reference image having said first resolution, the decoder comprising :

a memory having the capacity for storing said reference image with said first resolution; and

control means:

for decoding said images in a second, lower resolution mode with reference to two reference images having said second resolution, and

for storing said two reference images with the second resolution in said memory.

12. (Previously presented) A method of decoding images in a first resolution mode with reference to a reference image having said first resolution, comprising the steps of:

storing said reference image with said first resolution in a memory having the capacity therefore;

decoding said images in a second, lower resolution mode with reference to two reference images having said second resolution;, and

storing said two reference images with the second resolution in said memory.